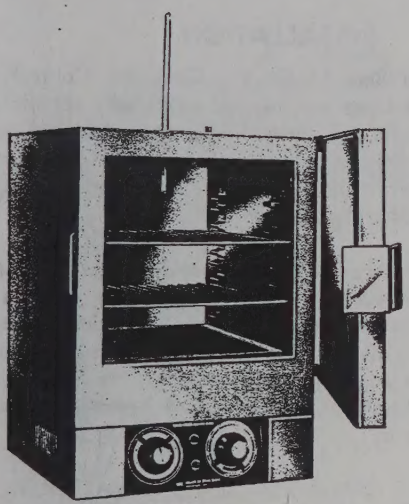
INSTRUCTION I-1000-2A
NOVEMBER, 1967



OPERATION and MAINTENANCE MANUAL

BLUE M STABIL-THERM®

Bench Type
Gravity Convection

LABORATORY OVENS

MODELS OV-12A, OV-8A

BLUE M Electric Company
CORPORATE HEADQUARTERS: BLUE ISLAND, ILLINOIS 60406

OPERATION AND MAINTENANCE

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GENERAL INFORMATION

Gravity Convection units are not generally employed when extremely critical uniformity and close temperature tolerances are required. However, Gravity Convection units offer several advantages not found in Mechanical Convection units. They are:

A. A lower initial investment.

B. For a given temperature range and rating, the overall dimensions are smaller due to absence of baffles, motors, blowers, etc.

C. Less subject to break-downs and lower maintenance because of fewer moving parts.

When unit is used for operations such as preheating or heat soaking, they may be loaded somewhat indiscriminately and a large volume of work space may be utilized. Care should be taken, however, that shelf areas are not blocked off completely. UNDER NO CONDITION should work be placed on diffuser plate at bottom of unit. Thermal currents radiate upward from bottom of unit and large temperature differentials result if air flow is impeded. If flat sheets are to be processed, they should be placed in a vertical position if possible.

For more critical applications, the upper two-thirds of the unit is the most stable zone. Here the heated air from the elements has diffused with the work chamber air to provide an even temperature zone. Check temperature of this area as close to the work load as possible with an accurate thermometer or pyrometer. Excellent results may be obtained. Allow unit to become "temperature stabilized" before checking. A checking thermometer is normally supplied with all units.

Keep exhaust ports open slightly when operating. This allows air to circulate and reduces the possibility of "hot spots" forming in chamber. NEVER EXCEED TEMPERATURE RATING OF UNIT.

CARE AND CLEANING OF STAINLESS STEEL EXTERIORS

Keep its shining appearance by periodically cleaning as recommended. If this is done, unit will keep its appearance for many years.

On outside surfaces only, use damp cloth wrung out in a hot mild soapy solution. Take a clean cloth and dip in clear hot water. Wring out practically dry and wipe off soapy solution. Dry with a clean cloth.

Once a month, where practical, scour outside surfaces only. Use a high quality scouring compound that will not mar the surface. Tartaric acid may also be used as a cleanser. For stubborn dirts, spots or blemishes, use a stainless steel wool. DO NOT USE ORDINARY STEEL WOOL as it will scratch the surface.

Grease or oils can be removed by cleaning with vapor degreaser or other solvents such as benzine, etc.

INSTALLATION

A. All standard Blue M Electric Company Controlled Temperature Units are shipped electrically complete. Positioning unit and connecting proper electrical service is the only requirement to place in operation. Following information will prove useful in installing electrically operated devices.

When installing high temperature range units, allow sufficient air space between unit walls and building walls and/or flammable materials. Consideration must also be given to existing over-head wiring or adjacent wiring. A large, high temperature unit will raise the ambient temperature surrounding it.

DO NOT CONNECT UNITS TO ALREADY OVER-LOADED LINES. EXCESSIVE VOLTAGE DROP WILL ADVERSELY AFFECT OPERATION OF UNITS.

1. Plug line cord into source of power. (Voltage and frequency specified on data plate.) Line cord plug and receptacle are considered sufficient disconnect means if plug and receptacle are readily accessible to operator.

2. Blue M units supplied with a line cord have a three wire cord. Unit is automatically grounded when plugged in.

CAUTION:

DO NOT CONNECT NEUTRAL SIDE OF 120 V. LINE TO UNIT FOR GROUNDING PURPOSES.

3. Fused Protection should not exceed 125% of unit rating.

B. INSTALLATION OF SPECIAL UNITS

1. All units not shipped complete, or utilizing special components other than standard are classified as "special units". In these cases, connections will be indicated on diagram and covered by special instructions.

NOTE:

Above information to be used as a guide. Where conflicts occur between this information and local codes, local codes apply.

OPERATING INSTRUCTIONS

A. Set the Power Selector Switch to either the LOW, MEDIUM, or HIGH position.
(See below for proper setting procedure.)

NOTE:

The Power Selector Switch also functions as the main "off-on" switch.

B. Set temperature control to desired operating temperature.
(See calibration procedure.)

FEATURES OF BLUE M CONTROL PANEL

A. MAIN PILOT LIGHT . . .

Red light on panel; indicates power being supplied to control circuit.

B. HEATER PILOT LIGHT . . .

Amber light on panel; indicates heating elements are energized.

C. POWER SELECTOR SWITCH . . .

This switch is used in conjunction with the main control to monitor power to the heating elements. Using this switch, it is possible to supply maximum power to the unit for initial run-up and then reduce the power when operating temperature is reached. Settings are LOW, MEDIUM and HIGH. LOW setting may be used for temperatures up to approximately 120°C., MEDIUM setting from 120°C. to 180°C. and HIGH setting above 180°C.

NOTE: The above settings may be used as a guide, but they are only approximate as they depend on load conditions and the position of the vents.

D. TEMPERATURE CONTROL . . .

This is a direct acting thermostat which acts on the principle of thermal sensitivity of certain fluids. Control consists of sensing bulb, capillary tube, diaphragm, and a set of electrical contacts.

As temperature of sensing bulb is raised, fluid in the system expands, forcing diaphragm outward. Motion of diaphragm is utilized to open or close a set of electrical contacts. Power supplied to heating elements is controlled by these contacts.

Supplied as part of this control is Blue M's patented Memory Ring Dial system. This new dial assembly allows calibration at all temperatures within its range with pin-point accuracy and extreme ease. The inherent ability of this control system to relocate an exact preset temperature justifies the few minutes spent to calibrate it.

All dials are preset at the factory to a mid-range temperature at which point the Memory Ring is "zeroed". This calibration should suffice for at least 6 months to a year of normal use. When the control needs to be recalibrated proceed as follows:

HOW TO CALIBRATE THE "MEMORY RING DIAL"

1. The dial should be calibrated at some mid-scale temperature. For units having +260°C. maximum, use +150°C. For units of +100°C., use +50°C., etc.
2. Place the thermometer into the thermometer entrance port at top of oven until its immersion line (normally 2", 3" or 4" from mercury bulb portion) is visible inside the chamber.

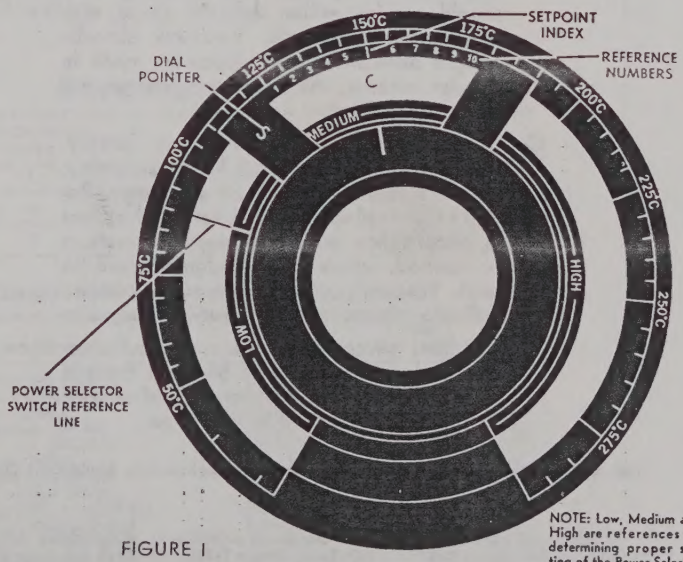

FIGURE 1

NOTE: Low, Medium and High are references for determining proper setting of the Power Selector Switch.

3. Set the power selector switch, if used, as per the reference lines on the temperature control dial. In the case of our example of +150°C., set at Medium.
4. Set the setpoint index on the dial pointer at +150° C. See FIG. 1.
5. Allow the unit to operate until the temperature stabilizes (approx. 1 hour).
6. If the unit stabilizes at a temperature above +150° C., proceed as follows:
   a) Turn the temperature control knob counter-clockwise slightly; the amount depends on how far the actual unit temperature exceeded +150°C.
   b) Again allow unit temperature to stabilize (approx. 15 minutes). Continue this procedure until thermometer indicates unit temperature is stabilized at precisely +150°C.
7. If the unit stabilizes at a temperature lower than +150°C., proceed as follows:
   a) Turn the temperature control knob clockwise slightly; the amount depends on how far the actual unit temperature was below +150°C.
   b) Again allow the unit temperature to stabilize (approx. 15 minutes). Continue this procedure until thermometer indicates unit temperature is stabilized at precisely +150°C.
8. When the required temperature (+150°C. in this example) is stabilized, loosen the set screw, being extremely careful not to rotate the knob while doing so.

   NOTE: There is a relatively strong spring in back of the control knob. When the Allen-head set screw is loosened, the spring will tend to push the knob off the control shaft.
9. Being careful not to rotate the shaft, replace the knob so that the setpoint index again lines up with the +150°C. mark. See FIG. 1.
10. Tighten the Allen-head set screw with knob in position.
11. The white ring on the dial is coated in order to receive pencil or ball point pen markings. Write the letter "C" directly under the +150°C. mark. This is a permanent future reference and indicates the unit is calibrated at +150°C.
12. Calibration at +150°C. is now complete.

USING THE REFERENCE NUMBERS

Suppose that after calibration at some midpoint temperature (in this case +150°C.) you also wish to use some other temperature(s). To do so, proceed as follows:

1. Rotate the knob so that the setpoint index line matches up with the desired temperature. Assume this temperature to be +220°C.
2. Allow the unit to stabilize with the dial set at that position.
3. If the temperature indicated by the thermometer does not agree with the dial setting, rotate the knob slightly in the proper direction, allowing the unit to stabilize.

   NOTE: ROTATING THE KNOB CLOCKWISE, INCREASES TEMPERATURE; COUNTER - CLOCKWISE DECREASES TEMPERATURE.

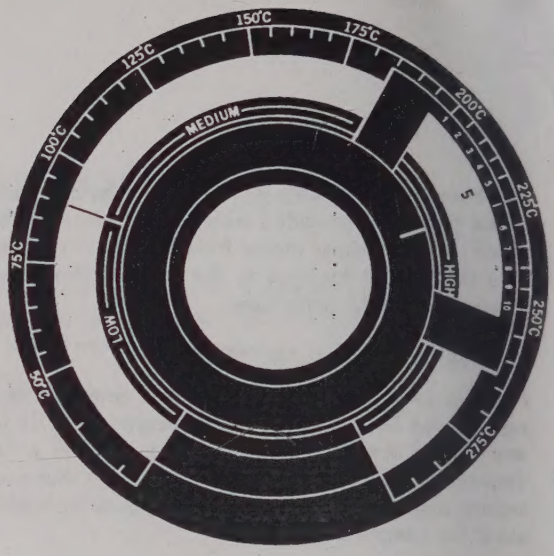

FIGURE 2

4. After the unit has stabilized at +220°C., note which reference number is lined up with +220°C. Assume that reference number 5 lines up with +220°C. See FIG. 2.
5. Write the correction number "5" on the white ring exactly under the +220°C. mark.
6. Now, in the future, whenever the control is returned to the +220°C. mark, the correction number "5" will appear in the "pointer window". It will coincide with number "5" on the dial pointer and automatically indicate proper control setting for repeating +220°C.
7. All other points are calibrated in the same manner. The dial may be calibrated during normal use by marking a correction factor each time a new temperature is required.

OPTIONAL ACCESSORIES

A. TIMERS

The six and twelve hour timers are all manual, spring-wound timers. Control knob is rotated in the clockwise direction past 1 hour and then set to the desired time. When timer unwinds, it shuts down unit. Timers are provided with a mechanical locking device to permit unit to operate for time periods in excess of timer rating.

CAUTION: When setting timers before unit has stabilized, allow additional time for temperature run-up. The twenty-four hour and seven-day timers are motor driven timers with a dial plate equipped with trippers. As dial rotates, trippers alternately open and close an electrical circuit. Dial trippers may be set a minimum of one and one-half (1½) hours apart on twenty-

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four hour timer and three (3) hours on seven-day timer. These timers are provided with a timer motor switch which stops the timer motor from rotating. The timer may then be set by hand to the "on" positions. See instructions inside timer door.

B. OVERTEMPERATURE PROTECTION

Provides protection for workload and prevents damage caused by excessively high temperatures. If for any reason the temperature should increase a few degrees above set point, the entire unit will shut down before any damage occurs. See enclosed instruction sheet for complete operation.

MAINTENANCE AND SERVICING

If the measured temperature is known to be in error or a set temperature cannot be maintained, check the following:

A. Check all fuses (line, instrument, etc.).

B. Check line voltage. Excessive voltage drop affects oven operation.

C. Check all electrical connections for loose or broken connections.

D. Inspect control sensing bulb for damage or deterioration.

E. Inspect door seal for leaks; door gasket should be replaced periodically, i.e., after 2 to 3 years of service.

F. Inspect heating elements for continuity and deterioration. To remove elements, proceed as follows:

1. Lay unit on its side and remove bottom cover, by grasping it at the center, front and back, and lifting out.
2. Remove element wires from terminals on ceramic blocks inside bottom compartment.
3. Remove two screws located on wire mesh diffuser plate.
4. Carefully remove wire mesh diffuser plate and then gently bend the control sensing bulb out of the way.
5. Loosen two nuts found on threaded shafts inside unit and turn back approximately ½ inch.
6. Slide element forward and lift out.
7. Reverse the above procedure for installation.

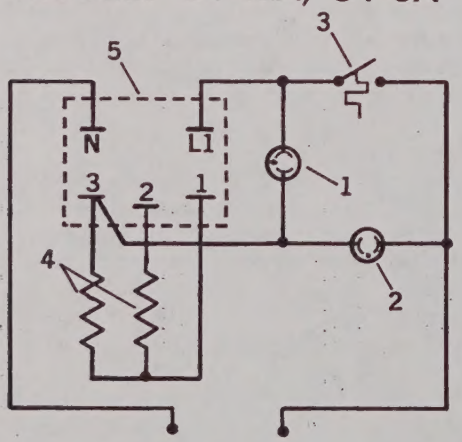
THERMOMETERS – GLASS TYPE

Mercury column may become separated during shipment or use. To reunite, please proceed as follows:

A. Gently heat the thermometer bulb until main mercury column and separate particles reach expansion chamber.

B. Tap gently until all mercury is united. Cool in a vertical position.

WIRING DIAGRAM, MODELS OV-12A, OV-8A



CATALOG SPECIFICATIONS

MODEL NUMBER	INSIDE DIMENSIONS (Inches) W.	D	H	MAXIMUM WATTS	VOLTAGE 50/60 CYCLE SINGLE PHASE	TEMPERATURE RANGE
OV-12A	12	12	12	975	120 V.	+38°C. to +260°C. (+100°F. to +500°F.)
OV-8A	8	8	8	525	120 V.	

REPLACEMENT PARTS LIST – MODELS OV-12A, OV-8A

ITEM NUMBER	DESCRIPTION	PART NUMBER	NUMBER REQUIRED	PRICE EACH
1	Control Pilot Light (Amber)	P-4028A	1	$ 2.25
2	Main Pilot Light (Red)	P-4028R	1	2.25
3	Temperature Control	CB-1001	1	17.95
†4	Heating Elements (OV-8A)	A-121-305A	1	11.00
	(OV-12A)	A-121-273	1	15.00
5	Power Selector Switch	S-3013	1	5.75
*6	Shelf Stainless Steel OV-8A	SH-1004	1	5.00
	Shelf Stainless Steel OV-12A	SH-1005	1	9.00
*7	Thermometer (0°C. to +260°C.)	T-512	1	5.50
*8	Latch & Strike, Chrome-Plated	L-128CH	1	15.00
*9	S/S Wire Mesh Element Shield OV-8A	DFP-116	1	6.00
*10	S/S Wire Mesh Element Shield OV-12A	DFP-117	1	8.00
*11	Exhaust Port Cover	ES-105	As Req'd.	3.00
*12	Door Gasket (OV-8A)	G-7044	1	2.00
	(OV-12A)	G-7060	1	2.50
**13	Weston Dial Testing Thermometer	T-300C	1	8.75
**14	Autotransformer 240 V./120 V. (OV-8A)	T-8070	1	32.50
**15	Autotransformer 240 V./120 V. (OV-12A)	T-8091	1	35.00
**16	Glass Viewing Panel Only (OV-12A)	GP-100	2	4.00

*Parts Not Shown. **Optional Equipment. †Element Coils Only May Be Ordered at 50% of Listed Price.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE. PARTS SHIPPED F.O.B. BLUE ISLAND, ILL. WHEN ORDERING PARTS GIVE MODEL No., SERIAL No., VOLTAGE AND PART No.

FACTORY WARRANTY/GUARANTEE

GRAVITY CONVECTION TYPE UNITS

DESCRIPTION OF COMPONENT	TYPE AND TIME OF WARRANTY/GUARANTEE (time from date of shipment)		
	60 Days	1 Year	Over 1 Year
Heating element; MODELLA or ETERNA	B	*C	*A
Indicators; pyrometers, thermometers	B	C	A
Thermocouple	B	A	A
Timers	B	C	A
Automatic Temperature Control	B	C	A
Switches	B	C	A
Transformers	B	C	A
Relays/contactors	B	A	A
Miscellaneous electrical wiring parts; pilot lights, resistors, terminal strips, etc.	B	C	A
Unit proper; cabinet, etc.	C	C	A

*MODELLA or ETERNA heating elements have a 2 year time period instead of 1 year.

A—Part not Guaranteed or Guarantee has expired.

B—New replacement part shipped immediately. Customer will be invoiced for part. Full credit issued upon receipt and inspection of defective part. All parts subject to our inspection for abuse, etc. Warranty void should our inspection indicate abuse, misuse, over-heating, etc. Factory absorbs freight both ways with shipments made in regular manner. Air shipment charges will be made collect.

C—Defective part returned to our factory, transportation prepaid. If found defective, we will repair or replace at no charge. Repaired or replaced part(s) returned collect in accordance with customers instructions or method, which in our judgment, will be best. Warranty void should our inspection indicate abuse, misuse, over-heating, etc.

D—This item covered by separate manufacturer's warranty. Contact Blue M Electric Company for name and location of nearest service representative in your area.

Note 1. Guarantees do not apply to non-standard accessory items ordered with unit.

Note 2. Guarantees do not apply when our standard parts are substituted with parts from other suppliers with whom Blue M Electric does not have a working service agreement.

Note 3. Collect shipments are not accepted at factory without written or verbal permission from authorized personnel. If done so, we reserve the right to invoice for these collect charges.

Note 4. This warranty or guarantee is not transferable.

Note 5. To allow for installation of units all time limits are subject to a 30 day maximum extension period.

Note 6. Claims for damages or shortages must be made within 10 days after receipt of unit.

Note 7. Blue M Electric Company assumes no responsibility when alterations are made without consent.

For spare parts and service, contact your local Laboratory Equipment Distributor, or any of the following Blue M Sales and Service Centers:

ARIZONA - SCOTTSDALE
4 East Indian School Road 85251
(602) 947-7026

CALIFORNIA - EL MONTE
9650 Telstar Avenue 91731
(213) 442-6672

CALIFORNIA - SAN MATEO
327 N. San Mateo Drive 94010
(415) 342-3983

CONNECTICUT — MILFORD
1340 Boston Post Road 06460
(203) 878-6033

ILLINOIS - BLUE ISLAND
138th and Chatham Street 60406
(312) 385-9000

MASSACHUSETTS - NATICK
15 Strathmore Road 01760
(617) 235-8320

NEW YORK - NEW ROCHELLE
271 North Avenue 10801
(914) 632-1465

PENNSYLVANIA - ARDMORE
219 East Lancaster Avenue 19003
(215) 649-1448

WASHINGTON - SEATTLE
1836 Westlake Avenue North 98109
(206) 282-0606

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MANUFACTURERS AND ORIGINAL DESIGNERS OF CONSTANT TEMPERATURE CONTROLLED EQUIPMENT.

MP MASTER
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